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AGRICULTURAL AND MECHANICAL COLLEGE
AGRICULTURAL EXPERIMENT STATION
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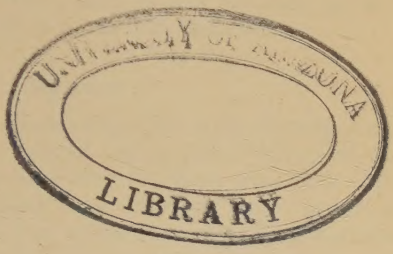

Soybeans for Oklahoma

B. F. KILTZ

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SOYBEANS FOR OKLAHOMA

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Importance

Soybeans have not been grown extensively in Oklahoma until the last few years. During the years 1926 to 1929 the acreage has increase remarkably in the northeastern part of the state and to a marked degree throughout the central and eastern portions. Continued increases in acreage are expected as the soybean finds its place among the crops of the state, and as its possibilities on the various soils and under the varying climatic conditions are determined.

A great deal of interest has been shown all over the state concerning the value of soybeans and the methods to be used in their culture.

Adaptation

In general, soybeans seem to require about the same climatic and soil conditions as corn. It is sometimes claimed that soybeans are more drouth resistant than corn. However true this may be, those who have worked with soybeans in the state seem to think that they will never be an important addition to the agriculture of that part of the state which does not have enough rainfall to grow a corn crop. According to experimental work up to the present time, the growing of soybeans has been very disappointing over most of the western sections of the state. The drouthy conditions that prevail during the mid-summer months and the depredations by rabbits upon the young plants, with the consequent higher yields and greater reliability of other crops such as cowpeas and mung beans, will prevent the soybean from extending its range of importance.

Progressing from west to east soybeans can be expected to increase in acreage very noticeably. This should be especially true in the eastern third of the state where acid soils prevent legumes such as alfalfa and sweet clover from thriving. The dairymen, especially, are in need of a leguminous hay crop that can be grown on soils deficient in lime. Although not particularly adapted to acid soils, soybeans will thrive on such soils much more readily than will alfalfa which has become so useful in central and western Oklahoma. Soybeans have been grown with varying success through the central part of the state. Many express a great deal of enthusiasm for the crop; others have failed. The successes have been numerous enough to lead those interested in the soybean to believe that it has possibilities.

Varieties

Most of the varieties that have been tried at the Oklahoma Agricultural Experiment Station at Stillwater are briefly described below. Some of this information has been adapted from "The Soybean," by W. J. Morse and C. V. Piper, a book recently published by the McGraw-Hill Book Company, and from United States Farmers' Bulletin No. 1520 on "The Soybean, Its Culture and Varieties," by W. J. Morse

The flowering period given in the following descriptions indicates the date of the appearance of the first flowers at Stillwater. This period is used as an index to the earliness of maturity for the different varieties.

Biloxi—Introduced from China in 1908. Flowering about August 15. Seed is dark brown; about 112,000 to the bushel. This variety produces rather high yields of rather coarse forage. Seed yields are very low due to its late maturity.

Chiquita—Introduced from China in 1910. Flowering about July 10. Seed straw yellow, seed scar brown; about 242,,000 seed per bushel. This variety is highly recommended for Oklahoma, producing a good quality of both seed and forage.

Columbia—Introduced from China in 1908. Plants stout, erect; flowering about June 20. Seed green, seed scar tawny; 200,000 to the bushel. This variety gives fair yields of both hay and seed.

Dixie—Introduced from Corea in 1914. Plants stout, erect, bushy; flowering about June 25. Seed straw yellow with yellow seed scar; about 211,000 seeds to the bushel.

Haberlandt—Introduced from Korea in 1901. Plants stout, erect bushy; flowering about July 10. Seed straw yellow, seed scar brown; 144,-000 seeds to the bushel.

Hollybrook—Selection from Mammoth Yellow about 1902 by T. W. Wood and Son, Richmond, Virginia. Plant stout, erect, bushy; flowering about July 1. Seed straw yellow, seed scar light brown; 157,400 seed to the bushel.

Laredo—Introduced from China in 1914. Plants slender, erect; flower-in about July 25. Seed black, flat, seed scar black; 466,500 seed to the bushel. Highly resistant to wilt and rootknot or nematode injury. This variety has been the most consistant high yielding hay of any of the varie-ties included in the test.

Mammoth Yellow—Origin not definitely known. Plant stout, erect, bushy; flowering about August 1. Seed straw yellow, seed scar tawny; 128,700 seed to bushel. Forage somewhat coarse.

Manchu—Introduced from Manchuria in 1913. Plant stout, erect, bushy; flowering about June 15. Seed straw yellow, seed scar black; 141,000 seed to the bushel. Produces a high yield of seed but a low yield of forage.

Midwest—Introduced from China in 1901. Plants stout, erect, bushy; flowering about June 25. Seed straw yellow, seed scar tawny to cinnamon brown; 243,000 seed to the bushel. This variety is sometimes called "Medium Yellow."

Morse—Introduced from Manchuria in 1906. Plant stout, erect, bushy; flowering about June 20. Seed olive yellow or green, seed scar yellow; 149,700 seed to the bushel. This variety often produces excellent yields of seed and fair yields of hay.

Old Dominion—Introduced from China in 1917. Plants slender, erect, with twining terminals, inclined to lodge on fertile soils; flowering about July 15. Seed brown with brown seed scar; 187,500 seed to the bushel. Produces excellent hay but sometimes difficult to harvest for seed because of its tendency to lodge.

Otootan—Introduced from the Hawaiian Islands in 1911. Plants slender, erect, bushy; flowering about September 1. Seed black, seed scar black; 368,600 seed to the bushel. This variety is too late for Oklahoma conditions; seed seldom matures.

Peking—Selection from seed introduced from Peking, China, 1907. Plants slender, erect, bushy; flowering about July 5. Seed black with black seed scar; 383,300 to the bushel. This variety produces a high yield of seed and a fair yield of forage in Oklahoma.

Pine Dell Perfection—Plants slender, erect; flowering about July 1. Seed marbled, black and olive green, seed scare black; about 210,000 to the bushel. This variety produces a good yield of both seed and hay. Its seed yield was highest of all varieties in the 1927 tests.

Tarheel Black—Introduced from China in 1905. Plants stout, erect; flowering about July 20. Seed black, with black seed scar; about 163,200 seed to the bushel.

Virginia—Selection from Morse in 1907 at the Arlington Experiment Farm, Virginia. Plants slender, erect, the tips twining; flowering about June 25. Seed olive or brown with brown seed scar; about 207,300 seed to the bushel.

This variety has given good results in northeastern Oklahoma.

Wilson—Introduced from Manchuria in 1906. Plants slender, erect; flowering about June 20. Seed black, seed scar black; 144,000 to the bushel. Produces a fair amount of both seed and forage.

Wilson Five—Selection from Wilson in 1912. Plants slender, erect; flowering about June 25. Seed black with black seed scar; about 301,400 seed to the bushel.

Varieties that begin blossoming after August 1 are too late for northern Oklahoma. Such varieties will produce considerable forage but seed yields are very uncertain.

Taking both seed, and quantity and quality of hay into consideration, the varieties that can be recommended for general agricultural purposes are: Laredo, Chiquita, Wilson, Morse, Virginia and Peking. A few others show promise of being important but are not recommended until further experiments have been made.

Table 1. Yields of Soybean Hay and Seed at Stillwater.

Variety	Hay in tons per acre					Seed in bushels per acre			
	1926	1927	1928	1929	Ave.	1927	1928	1929	Ave.
Biloxi	1.12	1.32	1.29	1.92	1.54	(*)	(*)	.37	.12
Chiquita	.94	1.72	1.15	1.39	1.30	7.7	3.1	4.86	3.22
Columbia	.87		1.20	1.02	1.03		12.4	7.07	9.73
Dixie	.52	.57	.99	.93	.75	7.9	7.1	6.06	7.03
Haberlandt	1.00	1.27	1.25	1.11	1.16	10.2	7.5	8.97	8.89
Hollybrook		1.64	1.11	1.34	1.36	11.4	6.2	7.52	8.37
Laredo	1.55	2.09	1.49	1.80	1.73	6.7	1.1	8.65	5.48
Mammoth Yellow	1.00	1.89	1.11	1.53	1.38	5.0	.4	7.50	4.30
Manchu	.60	.59	1.43	1.18	.95	11.2	15.0	10.0	12.1
Midwest		1.05	1.07	1.36	1.16	9.9	7.5	8.25	8.55
Morse	1.05	1.00	1.77	1.55	1.34	13.5	13.2	10.11	12.27
Old Dominion		1.74	1.52	1.47	1.58	9.3	2.6	4.43	5.44
Otootan		1.49	1.13	1.68	1.43	(*)	(*)	.83	.28
Peking			1.81	1.50	1.65		12.4	9.18	10.79
Pine Dell Perfection		2.04	1.11	1.13	1.42	17.6	11.0	9.47	12.69
Tarheel Black	.82	1.62	1.14	1.69	1.32	3.0	4.4	7.20	4.9
Virginia	.95	1.48	1.27	1.62	1.33	11.6	12.4	7.31	10.44
Wilson	1.10	1.38	1.48	1.75	1.43	12.5	11.5	10.01	11.34
Wilson Five	.98	1.15	1.45	1.21	1.20	11.6	11.9	9.61	11.04

* No grain produced.

Seeding

Seed Bed Preparation—The seed bed requires about the same attention as for corn. The ground should be plowed, harrowed down and seeded in rows. Planting in clean cane or wheat stubble with discing as the only previous preparation, gives moderate success if the seed bed is moist and fairly mellow. Soybeans respond to any extra attention given to the seed bed and do better when grown in soil free from previous crop residues.

Listing has been advocated by some growers.

Rate of Seeding—If the soil is fertile and the land is comparatively free from weeds, broadcasting may be practiced with fair success. This practice is not ordinarily followed because of the high price of seed. About three times as much seed is required to seed broadcast and in narrow drill rows as in ordinary 3 to 3½-foot rows. If a seed crop is desired, the plants are more easily harvested when planted in rows. When broadcasted, about one bushel of seed per acre will be required. When seeded in rows, about 20 pounds are required. These are average quantities and will vary with different varieties. It will be noted in the description of the varieties that there are many more seed to a bushel of some varieties than of others. The larger seeded forms should be planted at a heavier rate than the smaller seeded ones. Planting Laredo soybeans at the rate of 20 pounds to the acre in three-foot rows is planting an average of one seed to about every inch and a half in a row. Fifteen pounds would likely be enough for general purposes when planting this variety. Morse or Wilson seed when planted at the rate of 20 pounds per acre in three-foot rows would place one seed to every three and a half inches which would be about right. A heavier rate would improve the quality of the hay. Fertile soils can be seeded at a heavier rate than infertile soils.

The grain drill can be used to plant soybeans by stopping up some of the holes and spacing the rows at the desired distance.

Date of Seeding—Soybeans may be planted any time after corn planting time until early July. Plantings made about April 15 have materially outyielded later plantings at Stillwater in forage production. Early varieties such as Morse, Wilson and Manchu cannot be expected to produce good yields when planted late. Most soybean varieties mature their seed at a regular date and this date is not materially postponed by later planting. This means that early varieties have but a short period to mature when planted late and therefore do not yield nearly so well as when planted early. There is no advantage, however, in planting before the soil warms up well.

Some growers have tried planting soybeans after a small grain has been taken off and met with considerable success. When this is done only the medium to late varieties should be used such as the Laredo or Chiquita.

Depth off Planting—Some care should be exercised in planting the seed shallow enough to allow the young seed leaves to come through the soil. Deep planting is often disastrous especially if rains pack the soil or form a crust at the surface.

Inoculation—Soybeans use nitrogen from the air in the same way as do most other legumes. This is done through the activities of a bacteria that lives on the roots and produces growths known as nodules. The bacteria that develop on the soybean apparently are of a different strain than those that develop on any other legume. For that reason it is frequently necessary to obtain this bacteria and inoculate the soil.

An experiment at Stillwater with inoculated seed compared with uninoculated seed gave some interesting figures. In every case the inoculated plants produced more forage than the uninoculated ones. The seed yields, however, were not consistently higher. Table 2 shows the gain in favor of inoculation. This experiment covers one year only.

Table 2—Yields of Inoculated Soybeans Compared with Uninoculated Soybeans Average of Duplicated Plots in Pounds Per Acre, 1929

Variety	Hay Yield	Diff. in Favor of Inoculation	Seed Yield	Diff. in Favor of Inoculation
Peking — inoc.	2709	546	501	8
Peking — uninoc.	2163		493	
Laredo — inoc.	3700	1172	479	69
Laredo — uninoc.	2528		410	
Morse — inoc.	2992	733	439	69
Morse — uninoc.	2259		370	

If soybeans have not been planted on the land previously or the soil is somewhat deficient in lime, inoculation is imperative. Soybeans do very poorly on soils low in nitrogen unless these bacteria are present.

If soybeans have been grown on the farm the year before and have produced nodules as evidence of a successful inoculation, the soil from this ground can be used to inoculate a new field. A grain drill with a fertilizer attachment is an excellent implement for this purpose. Another method sometimes recommended is to mix one gallon of dry, sifted soil with a bushel of seed.

The method most conveniently used and as effective and cheap as most of them is the use of commercial cultures sold by seed houses and other concerns. These cultures should be fresh each season. The cost will vary from 15 to 25 cents per acre when planted in rows. The method of application should conform with the directions of the manufacturer.

Fertilizers—On many soils of the eastern part of Oklahoma where soybeans are best adapted, it will pay to use fertilizers. Many of these soils are low in phosphorous and some of them are low in the three nutrients usually supplied in fertilizers, nitrogen, phosphorous, and potash.

If soybeans are used in rotation with cotton, and the cotton has received a reasonable application of fertilizer, the soybeans may be able to use the residual effect from the cotton fertilizer, but usually on land that has received no fertilizer on the previous crop, one hundred pounds of superphosphate will more than double the yield of soybean hay. As an indication of how fertilizers will increase yields on some of the eastern prarie soils of Oklahoma, the results for 1929 in McIntosh county are given. This test was carried in duplicate and three check plots without any treatment were used. The soybeans were planted and fertilizer applied April 20, and the harvesting was done October 1. The following table gives the yield of hay per acre figured on an air-dry basis:

Average of checks	2031 lbs. per A.
Superphosphate 100 lbs.	5103 lbs. per A.
Superphosphate 200 lbs.	5355 lbs. per A.
4-12-4, 133 lbs.	4985 lbs. per A.
4-12-4, 266 lbs.	7374 lbs. per A.

You will note that 100 pounds of superphosophate more than doubled the yield of soybean hay in comparison with the checks; 200 pounds gave a further increase, but very little increase over 100 pounds application.

An application of 133 pounds of complete fertilizer, 4-12-4, more than doubled the yield, and an application of 266 pounds increased the yield more than 3½ times over the average checks.

From this test it is difficult to know whether or not this increase from the use of the complete fertilizer over superphosphate alone is due to nitrogen or potash, but evidently this soil is very low in phosphoric acid, and must also be low in nitrogen and potash.

Cultivation

Soybeans are cultivated much the same as corn. Harrowing the land before planting and once after the soybeans have appeared is very beneficial. The rotary hoe has been used with considerable success but is not effective on

any but very small weeds. Two or three cultivations with the surface or shovel cultivator will usually be necessary. The rows should not be ridged if the crop is to be used for hay, to avoid difficulty in mowing. Cultivations should be discontinued after the plants bloom since many of the flowers are broken off by the cultivator.

Harvesting the Hay

Time of Cutting—Soybeans make valuable hay at any stage of development. Even the mature plant fed as straw is relished by most livestock. The greatest amount of nutritious hay can be obtained about the time the pods become well formed. Earlier cuttings produce a lower total yield and are less easily cured, but produce a more nutritious and palatable hay than do the later cuttings.

If a period of dry weather sets in, early cutting is frequently advisable to prevent a loss of leaves. When a large per cent of the lower leaves begin to turn yellow the grower should not hesitate to cut the beans since the major part of the protein is found in the leaves.

Method of Curing—Under most conditions the hay can be cured much the same as other tame hay, allowing the hay to spend most of the curing period in the windrow or the cock. Binding the crop and shocking it after the fashion of small grains is also becoming popular. If the weather is inclined to be wet and unfavorable, the crop may be piled upon poles in the same way that field beans are sometimes cured.

If the hay is stacked in the open, grass of some kind should be used to top out the stack so it will shed rain more effectively.

Yield—It will be noted in Table 1 that adapted varieties of soybeans can be expected to yield from one to two tons per acre with an average of about one ton and a half.

The Laredo variety has produced an average of about one and three-quarters tons of cured forage on upland silt loam soil. During the season of 1929, the Laredo produced 1.8 tons per acre on upland soil for an average of three replications. This same variety on fertile bottom land soil yielded nearly five tons of cured hay for an average of two replications. A great deal of variation is, of course, expected under various soil and climatic conditions.

Harvesting Seed

The seed of soybeans, unlike cowpeas, all mature at about the same time. This allows the growers to harvest the seed more readily by machinery.

Time of Harvesting—The crop should be harvested for seed about the time most of the pods have turned brown. Many of the leaves will have dropped off by this time. Considerable seed is often lost from shattering. This loss can be reduced by harvesting before the seed pods become fully ripe. The crop may be harvested somewhat earlier than the period suggsted above

to save some hay and seed at the same time but this results in an inferior quality of both seed and hay. Setting aside part of the field for a seed crop only would be more satisfactory.

Methods of Harvesting—The most common machines for harvesting seed are the binder and the mower. When harvested with the binder, the crop is more easily handled, and with the tall, erect varieties, this machine is preferred. The low, bushy or viny forms can be gathered more effectively with the mower. A side delivery attachment prevents shattering that would otherwise occur as the mower and horses passed over the mown beans.

Various forms of bean harvesters have been used with excellent results. One form is built on the order of a riding cultivator with blade attachments cutting the beans immediately below the surface of the ground. The beans are then forked into piles. A machine of this kind is valuable in harvesting the low growing varieties. Another form of bean harvester useful in some sections follows the row and beats the seed out of the standing plants with the arms of a revolving reel. The seed is gathered into a large box inclosed on three sides. The seed must be entirely ripe for this machine to do well.

The combine is coming into favor wherever soybeans are grown on an extensive scale and where weather conditions permit its use. Several instances have been reported over the state where combining was tried successfully. Here too, the seed must be thoroughly ripe and some seed is lost from shattering.

Threshing—The common grain separator is used as a general rule in Oklahoma. As the soybean increases in importance, bean-hullers and separators especially designed for the purpose will doubtless become more common. The grain thresher must be adjusted to prevent splitting the beans. Some threshermen recommend no adjustments other than substituting boards for the concaves. Others recommend that the speed of the separator be reduced and the speed of the blower maintained at its normal rate by using cylinder pulleys twice normal size.

Yield—Table 1 gives the yields obtained for 19 varieties tried at Stillwater. For general agricultural purposes, a variety should produce a high yield of nutritious hay and a fair quantity of seed. A yield of ten bushels of seed per acre is usually considered a fair yield for the hay varieties on upland soil. Yields of 20 bushels are not at all uncommon on fertile soils.

Uses of the Crop

A complete enumeration of the various uses of the soybeans will not be attempted here. A brief consideration of the few major uses will suffice at this time.

Hay—Soybean hay is a very palatable and nutritious feed as demonstrated by feeding experiments carried on at various experiment stations. Soybean hay has been given a rating practically equal to alfalfa hay for stock feeding purposes.

Pasture—Where swine production is an important industry, soybeans have supplied pasture very profitably. Planting soybeans with corn, either in alternate rows or in the same row with the corn is a common practice. Where either fertility or rainfall limit crop production, the use of alternate rows is doubtless preferable. The entire field is "hogged off" allowing the hogs to feed at will. Experimental evidence indicated that greater profit is realized when soybeans are supplemented with concentrated feeds of some kind. Soybean pasture produces a soft fat, an objectionable trait they have in common with peanuts. Supplementary feeds of cottonseed meal or corn tend to overcome this difficulty.

Soil Builders—The fertility of the soil cannot be expected to increase after growing soybeans if the crop is removed and none of the residues returned. Although the soybean plant ordinarily gets the greater part of its nitrogen from the air, most of this nitrogen is stored in the top. At best, the nitrogen supply is merely maintained when the crop is removed. If the soil is not inoculated, the soybean depletes the nitrogen supply rather than builds it up.

As the crop is generally handled, the increase in crop yields following the soybean is no doubt due to the improved physical condition of the soil and to the greater availability of plant nutrients caused by the rapid decaying of soybean roots. This improved condition of the soil gives the soybean an important place in a crop rotation.

Turning the crop under as green manure is not a general practice mainly because the soybean can be grown for other purposes with greater profit. Experiments have shown that its value is about equal to that of cowpeas. The Arkansas Station has found that if the stubble only is turned under, the cowpeas are of greater value because of more nitrogen retained in the roots than is the case with the soybean. Soybeans grown in alternate rows with corn or sorghums, or grown alone, and pastured with hogs will leave the soil in an improved condition.

Oil—Although the soybean has been used mainly for forage purposes, in Oklahoma, the time will doubtless come when there will be a surplus of seed. This seed may become useful for oil extraction. The oil from the bean has a great many commercial uses and commands a good price. In addition, the meal that remains after the oil has been pressed out is valuable for stock feeding purposes.

Rabbits

Rabbits have been responsible for a large number of failures with soybeans in Oklahoma. This is especially true when the crop is first introduced because of the small acreage in that community. In some sections the entire fields of young plants are eaten off to the ground.

If the rabbits are killed throughout the year, wherever possible, these losses can be reduced materially.. Sweet potato cubes or green alfalfa hay poisoned with strychnine has been suggested. Extreme care is necessary in the use of such poison to prevent livestock from having access to the fields.

Outfield Station Results

Soybeans have been grown at the outifeld stations for from two to five years. These experiments have been under the supervision of Mr. H. C. Potts, who has been in charge of the outfield station work in the state. These station results are briefly summarized as follows:

Durant—Yields have been comparatively high. The Laredo has given consistent high yields of both seed and hay.. The Chiquita and the Old Dominion have given exceptionally good yields of hay. The Morse and the Mammoth Yellow have compared favorably in seed production.

Eufaula—Some difficulty was experienced in harvesting the crop at this Station due to continued rainy weather at harvest time. Seed yields have been affected so frequently that very little weight can be attached to the results. The hay yields have been complete enough to allow some conclusions. The Laredo has given the highest yield every year of the test.

Okmulgee—All varieties at this Station are consistently high in yields of both seed and hay. The Laredo and Biloxi have given the highest hay yields. The Biloxi seldom matures much seed in Oklahoma and is not to be recommended.

Purcell—The rabbits have presented a problem in obtaining comparable results at this Station. Yields of both seed and hay have been encouraging but the results are not complete enough to allow definite conclusions to be drawn.

Sapulpa—The Laredo variety was the most productive soybean for hay purposes. The Morse and the Old Dominion also gave good results. Wet weather has made seed yields uncertain; consequently, no grain was harvested in many instances.

Nowata—The Virginia and the Laredo have both been highly productive for hay, averaging about two tons per acre. Morse, Old Dominion, Chiquita and Wilson have also yielded satisfactorily. The seed yields indicate that the early maturing varieties can be expected to yield the most.

Carrier—Yields at this Station are quite encouraging. The Chiquita gives promise of being important in this territory both for hay and seed. This variety has been suggested for vegetable oil production in central Oklahoma. The Old Dominion and Laredo have also given high yields.

Granite—Roy W. Ellithorpe, who has cooperated in these experiments, says in his 1928 report, "After growing the sixteen varieties of soybeans from one to four years, I find only four varieties that can be recommended for this section. They are the Laredo, Virginia, Wilson and Morse. The yield of hay from these varieties is less than one ton per acre with the chance of a total failure during an exceptionally dry year.

"Cowpeas double both the yield of hay and seed over soybeans. For this reason, the cowpea should be grown in preference to the soybean."

These results are of interest because they represent a part of the state usually considered unfavorable for soybeans.

The following are excerpts from letters from county agents giving their impressions of soybeans in their counties:

Okmulgee County. W. L. Fowler—"The soybean is a new crop for this county but it has been successfully grown wherever tried."

Coal County. Lee Craig—"Our chief problem here is harvesting the seed and keeping the rabbits away."

Seminole County. C. S. Sullivan—"I do not believe soybeans should be grown extensively in this county. There is not enough demand for the feed and there are other legume crops better adapted."

Le Flore County. C. M. West—"We cannot grow alfalfa and clovers as a rule without liming but soybeans do well."

Hughes County. M.. W. Plettner—"They will pay here when inoculated. Rabbits are serious pests."

Muskogee County. Earl W. Smith—"Soybeans planted at the rate of one-half bushel to the acre on bottom land produced such a growth that it was impossible to cut them with the mowing machine or binder."

Wagoner County. J. N. Lowe—"We can grow more high-class feed per acre with soybeans than with any other crop on the prairie. As a grain crop, it has returned more profit to the grower than any other crop we have grown the last two years."

Delaware County. E. A. Kissick—"I think the Laredo is the best all around soybean. The Chiquita may be best for 'hogging down.' "

Osage County. Fred A. Barham—"Good results have been obtained from hogging soybeans and corn. One of the chief problems here is the rabbits."

Kay County. E. H. Martin—"Farmers here usually harvest soybeans with a binder especially when hay is desired. The combine is becoming popular as a harvester for the seed crop."

Mayes County. E. B. Hildebrand—"We need soybean hay for dairy feed. As a cash crop they excell oats and most of the cotton."

Rodgers County. J. B. Taylor—"Where highest yields are obtained we find the farmer inoculating his seed and planting on soil that will grow a fair yield of other crops."

Craig County. E. M. Sledge—"On actual feeding tests we find that ground soybean hay is a splendid substitute for wheat bran, pound for pound. Soybean hay grown and sold to the mill in 1928 has averaged a return of $22.50 an acre. For the past two years, beans grown for seed have averaged the producer about $35.00 per acre. As a cash crop, the soybean has more than trebled oats in money value per acre."

Nowata County. Wesley Chaffin—"As a cash crop, soybeans are more profitable than oats, wheat or kafir."

Alfalfa County. Geo. F. Newton—"Our problem is to find a variety that will not shatter before it is ripe enough to combine."

Canadian County. Fred E. Percy—"We are recommending the Chiquita and Laredo varieties exclusively in this section."

Blaine County. W. R. Hutchinson—"Chiquita was planted on red clay soil June 1. Twelve bushels of seed per acre was obtained with the combine. Soybeans planted on stubble land in July made about five bushels per acre."

Stephens County. J. A. Killough—"The chief problem we have faced in growing soybeans has been protecting them from the rabbits."

Kiowa County. L. I. Bennett—"I have had several demonstrations in soybeans, but none of them went to maturity because of the jack rabbits."

Washita County. Teague S. Fisher—"Soybeans have been grown only in a very limited way in this county."

Harmon County. Tom M. Marks—"The yield is small being about one-fourth that of cowpeas."

It is regretted that space does not permit including these letters in full. The writer is deeply grateful to these men for their many valuable suggestions. An attempt was made to select letters that would cover the conditions over the whole state. Very few trials have been made in the northwestern part of the state. H. H. Finnell, Director of Panhandle Experiment Station at Goodwell, says, "Yields are generally low, about one and one-half tons being the greatest yield obtained from any variety during the five years and occasioally complete failures have been recorded."

There are still many problems to be worked out in the growing of soybeans. The control of rabbits, harvesting where wet weather occurs at harvesting time, the finding of varieties that will not shatter when combined and the selection of the best varieties to grow for oil purposes are problems that need to be solved. As the soybean becomes more widely grown and understood in this state, many of these difficulties will, no doubt, disappear entirely.

Acknowledgements

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